

REMARKS

Reconsideration of this Application is respectfully requested. Applicants have addressed every objection and ground for rejection stated in the present Final Office Action, and believes the Application is now in condition for allowance.

1. Statement of the Case and Status of the Claims.

The present invention is directed to a novel electrode active material represented by the nominal general formula:



wherein,

- (a) A is selected from the group consisting of Li, Na, K, and mixtures thereof, and $0 < a \leq 8$;
- (b) M comprises one or more metals, wherein at least one of the one or more metals is capable of undergoing oxidation to a higher valence state, and $1 \leq b \leq 3$;
- (c) Z is selected from the group consisting of a hydroxyl, a halogen, and mixtures thereof, and $0 < d \leq 6$;

wherein A, M, Z, a, b and d are selected so as to maintain electroneutrality of the electrode active material.

Claims 101 - 153 are currently pending in the present Application. Claims 101 - 109, 116 - 134 and 141 - 153 stand rejected, and Claims 110 - 115 and 135 - 140 stand objected to.

2. Rejections Under 35 U.S.C. §102(b)

Claims 101 - 109, 116 - 134 and 141 - 153 currently stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,721,070 to Shackle ("Shackle '070"). Shackle '070 discloses, among other things, an electrode material represented by the general formula (I):



wherein:

- (i) M is an alkali metal ion,
- (ii) T is a metal ion capable of existing in more than one stable oxidation state, and is selected from the group consisting of Mn, Fe, V, Ti, Co, Cu, Cr, Sn, Pb, W and Mo;
- (iii) A is a multi-element anion with a negative charge greater than 1, and is selected from the group consisting of SiO_4 , TiO_4 , VO_4 , FeO_4 , MnO_4 and PO_4 ;
- (iv) x is from about 1 to about 20;
- (v) y is from about 1 to about 4; and
- (vi) z is from about 1 to about 7.

Shackle '070 teaches that in some embodiments, the electrode material is "doped" by adding "other anions" (e.g. O^{2-} , S^{2-} , OH^{-1} , F^{-1} and Cl^{-1}). (See, Col. 4, ll. 34 - 67 of Shackle '070).

In contrast, Claims 101 - 109, 116 - 134 and 141 - 153 of the present Application recite, among other things, an electrode active material represented by the general formula (II):



wherein,

- (a) A is selected from the group consisting of Li, Na, K, and mixtures thereof, and $0 < a \leq 8$;
- (b) M comprises one or more metals, wherein at least one of the one or more metals is capable of undergoing oxidation to a higher valence state, and $1 \leq b \leq 3$;
- (c) Z is selected from the group consisting of a hydroxyl, a halogen, and mixtures thereof, and $0 < d \leq 6$;

wherein A, M, Z, a, b and d are selected so as to maintain electroneutrality of the electrode active material

In the present Final Office Action, the Examiner asserts "that the compounds $A_aM_b(PO_4)_3Z_d$ recited by the applicants are identical to the compounds $M_xT_yA_z$ disclosed by Shackle for the instances where A is PO_4 , one of only six anions specifically listed by Shackle as useful in his invention." Applicants respectfully traverse the Examiner's assertion.

The selection of a polyanion for moiety A of Shackles general formula (I) *is only one of many selections that must be made* in order to derive the specific subgenus of electrode active materials described by Applicants' general formula (II).

Stated differently, in addition to selecting $A = PO_4$, one with ordinary skill in the art would have to substitute, as a particular combination, the following *four* variables into Shackle's general formula (I), and then "dope" into the material the "other anions" described in Shackle '070:

- (1) $M = Li, Na, K,$ or a mixture thereof,
- (2) $0 < x \leq 8,$
- (3) $1 \leq y \leq 3,$ and
- (4) $z = 3.$

Accordingly, contrary to the Examiner's assertion that Applicants' general formula (II) can be derived from Shackle's general formula (I) by simply selecting $A = PO_4$, one must actually make selections for a total of *five* variables, and then "dope" into the material the "other anions" described in Shackle '070.

The Examiner also asserts that "one with ordinary skill in the art would be familiar with compounds of the formula $M_xT_yA_z$ with $A = PO_4$ and $z = 3$ as evidenced by the publications cited in the Shackle patent." In order to support the Examiner's rejection under 35 U.S.C. §102(b), one with ordinary skill in the art must be able to "at once envisage" Applicants' claimed invention *based on the teachings of Shackle '070*. Applicants submit it is improper for the Examiner to look to any reference other than Shackle '070 to support the Examiner's assertion that Applicants' claimed materials could be "envisaged" from the teachings of Shackle '070, because the Examiner is relying on 35 U.S.C. §102(b). In addition, Applicants submit the Examiner has failed to demonstrate that there is any teaching or suggestion in any of the publications cited in the Shackle '070 patent, which would motivate one with ordinary skill in the art to combine the their teachings in order to arrive at Applicants' claimed invention.

Applicants respectfully submit that the electrode active materials recited in Claims 101 - 109, 116 - 134 and 141 - 153 are not anticipated by the teachings of Shackle '070.

First, Shackle '070 fails to: (1) provide any teaching of a stoichiometric relationship between the "other anions" and the variables A, M, and T, (2) provide examples of active materials containing such "other anions," and (3) describe how to make electrode active materials "doped" with such "other anions."

Second, Shackle '070 *does not specifically recite as a subgenus*, electrode active materials such as those represented by general formula (II). Instead, it is necessary to pick-and-choose from among the multitude of possible selections for the variables A, M, T, z, y and z of general formula (I), and then "dope" into the material the "other anions" described in Shackle '070 (despite the absence of any teaching of the stoichiometric amount of the "other anions" to be added, any teaching of a stoichiometric relationship between the "other anions" and the variables A, M, and T, and without any teaching as to how to "dope" in such "other anions"), in order to derive the specific subgenus of electrode active materials described by Applicants' general formula (II). Accordingly, Shackle does not anticipate Applicants' claimed electrode active materials, because Applicants' claimed electrode active materials (as represented by Applicants' general formula (II)) are not "*clearly named*" in Shackle '070. (See, M.P.E.P., Rev. 2, May 2004, §2131.02).

Third, Applicants' claimed electrode active materials could not be "*at once envisaged*" from the teachings of Shackle '070, by one with ordinary skill in the art. Contrary to the Examiner's assertion, Applicants submit that Shackle's general formula (I) *embraces a vast number of electrode active materials*, not a limited number of materials which might allow one with ordinary skill in the art to *envisage* Applicants' claimed invention. Shackle '070 fails to provide any reason or benefit for selecting,

among the multitude of active materials embraced Shackle's general formula (I) in combination with the teachings that in some embodiments the electrode material is "doped" by adding "other anions," those electrode active materials recited in Applicants' Claims.

Furthermore, Shackle '070 lacks any teaching which would *suggest* to one with ordinary skill in the art to pick-and-choose from among the multitude of possible selections for A, M, T, x, y and z of Shackle's general formula (I), then "dope" into the material the "other anions" described in Shackle '070, in order to arrive at Applicants' claimed electrode active materials.

Stated differently, Shackle '070 lacks any teaching which would motivate one with ordinary skill in the art to substitute, as a particular combination, the following variables into Shackle's general formula (I), and then "dope" into the material the "other anions" described in Shackle '070:

- (1) $M = \text{Li, Na, K, or a mixture thereof,}$
- (2) $A = \text{PO}_4,$
- (3) $0 < x \leq 8,$
- (4) $1 \leq y \leq 3,$ and
- (5) $z = 3.$

Accordingly, Applicants respectfully submit that the electrode active materials recited in Claims 101 - 109, 116 - 134 and 141 - 153 could not be *envisaged* by one with ordinary skill in art, based on the teachings of Shackle '070.

Finally, Applicants further submit that neither does Shackle '070 support a rejection under 35 U.S.C. §103(a). (See, M.P.E.P, Rev. 2, May 2004, §2144.08). In

chemical cases, to establish a *prima facie* case of obviousness under Section 103(a) for a claimed species or subgenus in view of a single prior art reference, (1) a claimed species must fall within or be embraced by the genus taught in the reference, and (2) the reference must provide some motivation or suggestion to choose the claimed species/subgenus from among the compounds defined by the genus.

As noted above, Shackle '070 lacks any teaching which would motivate one with ordinary skill in the art to pick-and-choose from among the multitude of possible substitutions for A, M, T, z, y and z, as a particular combination, electrode active materials wherein (1) M of Shackle's general formula (I) is selected from the group consisting of Li, Na, K, and mixtures thereof, (2) A is PO₄, (3) $0 < x \leq 8$, (4) $1 \leq y \leq 3$, and (5) $z = 3$, then "dope" into the material the "other anions" described in Shackle '070. For this reason alone, Applicants' claimed invention is not *prima facie* obvious in view of the teachings of Shackle '070.

Therefore, Applicants respectfully submit that Claims 101 - 109, 116 - 134 and 141 - 153, are patentably distinct from Shackle '070. Accordingly, Applicants respectfully request withdrawal of the Examiner's present rejection.

3. The Rinaldi Reference

In the Office Action mailed May 20, 2004, paper no. 20040516, Claims 101 - 109, 116 - 134 and 141 - 153 were rejected under 35 U.S.C. §102(b) as being anticipated by Rinaldi, "The Crystal Structure of Graphite, Complex Phosphate Not a Garnetoid" Bulletin de Mineralogie, vol. 101(5-6), pp. 543-7 (1978) ("Rinaldi reference"). The present Final Office Action does not discuss the disposition of the above-identified Claims with respect to the Rinaldi reference.

In the event the Examiner does not deem the rejection withdrawn, Applicants herein incorporate by reference the remarks presented in Section 3.B. of Applicants' Response dated August 20, 2004.

4. **Rejection under 35 U.S.C. §103(a)**

Claims 110 - 115 and 135 - 140 previously stood rejected under 35 U.S.C. §103(a) as being unpatentable over Shackle '070, in view of U.S. Patent No. 6,017,654 to Kumta et al. ("Kumta '654"). In the present Final Office Action, the Examiner has deemed these Claims allowable over the prior art of record. However, the Claims stand rejected as being dependent upon a rejected base Claim.

Applicants thanks the Examiner for her consideration of these Claims, and for deeming the subject matter thereof allowable over the prior art of record. Applicants will refrain from amending the Application in accordance with the Examiner's suggestion, at this time, in order to provide the Examiner the opportunity to consider Applicants' remarks presented herein and to provide the Examiner to examine the Claims in view of recently issued U.S. 6,777,132 to Barker et al.

5. Summary

In view of the remarks presented herein, Applicants submit that all objections and grounds for rejection stated in the present Office Action have been overcome. Accordingly, Applicants respectfully submit that Claims 101 - 153 are allowable over the prior art of record. Should anything further be required, the Examiner is respectfully requested to telephone the undersigned at 702-558-1071.

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Respectfully submitted,

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